

Draft

Environmental Assessment  
for the  
Proposed Kings Bay Manatee Refuge  
Crystal River, Florida

U.S. Department of the Interior  
Fish and Wildlife Service  
Region 4



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## Executive Summary

The U.S. Fish and Fish and Wildlife Service proposes to modify the existing network of manatee protection areas within the waters of Kings Bay, located in Crystal River (Citrus County), Florida. Kings Bay is the primary wintering site for endangered Florida manatees in northwest Florida, a region that supports about 12 percent of the entire population of this subspecies. Manatees are attracted to Kings Bay's warm spring waters which they use as a thermal refuge during the winter months.

Visitors and local residents are also attracted to Kings Bay's waters. They come to see manatees and engage in other waterborne activities throughout the year. Recreationists view wintering manatees while snorkeling, skin diving, and SCUBA diving, and view them from boats, including kayaks, canoes, motorboats, and other conveyances. Other waterborne activities that take place on Kings Bay waters include boating, fishing, water skiing, swimming, as well as non-manatee related skin- and SCUBA - diving. Some manatees are harassed by the actions of recreationists viewing manatees. Manatees may also be harassed indirectly by the presence of large numbers of recreationists, whose sheer numbers may unintentionally displace manatees. Manatees are also injured and killed in Kings Bay as a consequence of other waterborne activities.

To prevent take of manatees, the Service and the Florida Fish and Wildlife Conservation Commission (Commission or FWC) created a network of sanctuaries and speed restrictions in Kings Bay to provide manatees with undisturbed wintering sites and safe travel corridors in waters shared with the public. These measures are supplemented with law enforcement efforts, a special use permitting program on National Wildlife Refuge property for manatee tour operators and videographers, and extensive, local education and outreach efforts. All measures are consistent with Federal and State authorities used to minimize the take of manatees. The Service manages this network in Kings Bay through its Crystal

River National Wildlife Refuge (Crystal River NWR). The Commission supports these management efforts through its Imperiled Species Management Section and law enforcement activities.

The number of reported cases of manatee harassment and manatees killed or injured due to human activities (takings) has increased concurrent with growing numbers of local residents and visitors, numbers of registered boats, increasing numbers of manatees, and the relatively recent presence of manatees throughout the year. (Previously, manatees were rarely seen in Kings Bay outside of the winter season.) To prevent the take of manatees (including harassment, deaths, and injuries), the Service proposes to designate all of Kings Bay as a manatee refuge, under the authorities of the Endangered Species Act of 1973, as amended and its implementing regulations.

A variety of alternatives were considered when developing this proposal. Considered alternatives included: modifying the existing network of manatee sanctuaries and speed restrictions; revising Federal regulations to include better takings definitions; and enhancing existing education and outreach activities with enhanced materials and programs.

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## 1.0 Purpose and Need for Action

The U.S. Fish and Wildlife Service has prepared this Environmental Assessment (EA) to analyze potential effects to physical and biological resources and social and economic conditions that may result from the proposed designation of a manatee refuge in Kings Bay, Crystal River, Florida. The West Indian manatee (*Trichechus manatus*) was listed as an endangered species on June 2, 1970 (35 FR 8491) under the Endangered Species Act of 1973, as amended (ESA) (16 U.S.C. 1531 *et seq.*), and the population is further protected as a depleted stock under the Marine Mammal Protection Act of 1972, as amended (MMPA) (16 U.S.C. 1361 *et seq.*). The West Indian manatee includes two subspecies: the Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*). Florida manatees can be found throughout the southeastern United States, with Florida at the core of its range. The Florida manatee's range includes Kings Bay, Florida.

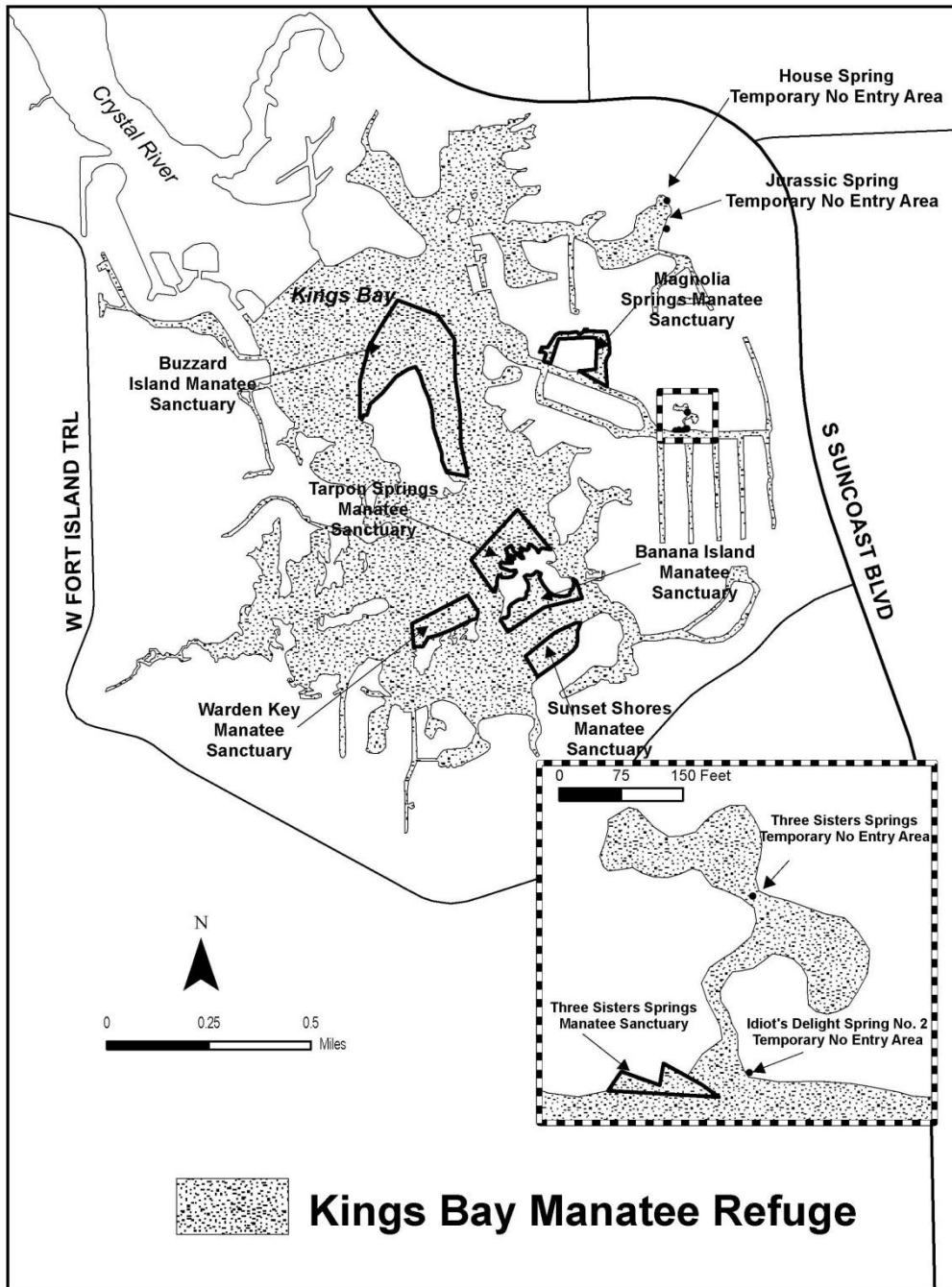
This EA will be used by the U.S. Fish and Wildlife Service (Service) to decide whether or not to propose designation of a manatee refuge, if the proposed action requires refinement, or if further analyses are needed through preparation of an environmental impact statement. If the proposed action or an alternative action is selected as described or with minimal changes and no further environmental analyses are needed, a Finding of No Significant Impact will be prepared. This EA has been prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) as implemented by the Council on Environmental Quality regulations (40 CFR §1500, *et seq.*) and Department of the Interior NEPA procedures.

## 1.1 Proposed Action

The Service proposes to designate the waters of Kings Bay as a manatee refuge. These waters include that tract of submerged land that includes all waters of Kings Bay, including all tributaries and adjoining waterbodies, upstream of the confluence of Kings Bay and Crystal River, described by a line that bears North 53°00'00" East (True) from the northeasternmost point of an island on the southwesterly shore of Crystal River (approximate latitude 28° 53'32" North, approximate longitude 82°36'23" West) to the southwesternmost point of a peninsula of Magnolia Shores (approximate latitude 28°53'38" North, approximate longitude 82°36'16" West). See Map "Kings Bay Manatee Refuge"

This designation will improve the Service's ability to manage an important manatee use area where significant levels of human activity occur. With a manatee refuge designation in Kings Bay, the Service will prevent the take of manatees as defined under the more restrictive of either the Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544), as amended, or the Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C 1361-1407), as amended. See Map 1.





Map 1. Proposed Kings Bay Manatee Refuge.

## 1.2 Project Need

The action proposed by the Service is needed:

- to prevent the take of manatees by human activities in Kings Bay
- to minimize human disturbance in a sensitive manatee wintering (sheltering) area

Manatees have historically been attracted to the warm, spring-fed waters in Kings Bay where they retreat from the cold during the winter. More recently, manatees have begun to use this area during the warm summer months as well. Wintering manatees have been the focus of a manatee viewing industry for many years and bay waters are widely used by commercial and recreational waterway users for a variety of activities throughout the year. Manatees are harassed by the viewing public. Manatees are struck and killed or injured by boats operating in Kings Bay throughout the year. The number of manatees struck and killed by boats in Kings Bay is increasing, as are the number of public reports of acts of manatee harassment.

Increasing numbers of in-water visitors to Kings Bay and an absence of adequate space at wintering areas in which manatees can shelter free from harassment and other forms of take prompt the need for this emergency designation. Without sufficient space within the existing Kings Bay sanctuaries to shelter, rest, and feed free from harassment, manatees are at risk when exposed to cold temperatures for any length of time. The numbers of visitors and manatees have increased since 1998 when the last sanctuary was designated in Kings Bay (63 FR 55553; October 16, 1998), and researchers have documented dozens of manatees outside the boundaries of the seven existing Kings Bay sanctuaries, already filled to capacity with wintering manatees (Kleen 2010, pers. com.). Manatees have been

harassed in areas that are outside the boundaries of the existing sanctuaries (Aloise 2010, pers. com.), and acts of harassment are likely to increase in the absence of additional measures.

From 1974 through 2010, 60 manatees died from collisions with watercraft in Citrus County waterways, including 16 manatees in Kings Bay. Thirteen of the 16 Kings Bay watercraft-related deaths occurred within the past 10 years. In 2008, Florida Fish and Wildlife Conservation Commission (Commission or FWC) recorded the highest number (8) of manatees ever killed by watercraft in Citrus County and three of these carcasses were recovered in Kings Bay (FWC FWRI Manatee Mortality Database 2011 website).

In order to designate a manatee refuge, there must be evidence that a manatee refuge is necessary to prevent the taking of one or more manatees. Based on the Service's own expertise and a review of the best available biological and commercial information, the Service believes that there is evidence to demonstrate that manatees will be taken in Kings Bay if no action is taken. Under existing management measures, manatees have been taken by recreationists observing manatees (harassment) and by boat operators who have harassed, injured, and killed manatees with their boats. Numbers of manatees, manatee use patterns (including information on areas used by manatees in the bay, seasonality, degree of use, etc.) and other biological information exists to show extensive manatee use of the area. Information derived from carcasses and other sources demonstrates that manatees are being taken by waterway users in and on the water.

### 1.3 Issues and Concerns

The West Indian manatee includes two subspecies: the Florida manatee (*Trichechus manatus latirostris*) and the Antillean manatee (*Trichechus manatus manatus*). Florida manatees can be found

throughout the southeastern United States, with Florida at the core its range. The Florida manatee's range includes Kings Bay, Florida. The Kings Bay springs constitute one of the most important natural warm-water refuges for manatees. Extensive efforts are ongoing by the Service and the FWC to recover this species. In particular, significant efforts are made to minimize human-related threats and to prevent the number of manatees taken by human activities.

### 1.3.1 Status of the Florida Manatee

The best, current count of the statewide manatee population is approximately 5,076 animals based on a single statewide count at warm-water sites and adjacent areas in January 2010 (FWC FWRI unpub. synoptic aerial survey data, 2011).

The most recently published information on Florida manatee population demographics (growth, survival, and reproductive rates) includes studies by Runge *et al.* (2004), Craig and Reynolds (2004), Kendall *et al.* (2004), and Langtimm *et al.* (2004). Updated adult survival rates for the Atlantic Coast and Northwest regions are reported in Runge *et al.* (2007). These analyses indicate that manatees are increasing or stable throughout most of Florida; while these authors do describe a declining growth rate in the Southwest Region, more recent data suggests that the growth rate in this management unit may be stable or even increasing (C.B. Langtimm, USGS Florida Integrated Science Center, pers. comm., 2010).

### 1.3.2 Threats to the Species

The primary, direct, human-related threat to Florida manatees is watercraft-related strikes which kill and injure these animals (Rommel *et al.* 2007, Lightsey *et al.* 2006). Natural threats include exposure to cold temperatures and red tides. A significant habitat threat to the Florida manatee is the loss of warm

water at natural, warm-water springs and at power plants (Laist and Reynolds 2005a, b). Natural springs are threatened by reductions in flow and water quality and by factors which affect manatee access and use of the springs (Florida Springs Task Force 2001).

A quantitative threats analysis that forecasted changes in the Florida manatee population under different threat scenarios was conducted by Runge *et al.* (2007). The threats analysis indicated that the most significant threats to Florida manatees are watercraft collisions and the potential loss of warm water habitat throughout the state.

Consistent with the Service's recovery goals for the Florida manatee, threats to the species must be reduced or eliminated such that the species no longer fits the definitions of threatened or endangered. The Service and FWC continue to implement recovery actions consistent with our authorities and necessary to achieve these goals.

### 1.3.3 Threats to Manatees in Kings Bay

Kings Bay is located within the City of Crystal River's city limits, in Citrus County, Florida. Citrus County and the City of Crystal River are an integral part of "Florida's Nature Coast", a northwest Florida region marketed for outdoor recreational opportunities, including opportunities for viewing manatees (Nature Coast Coalition 2010 website). In addition to viewing manatees, area recreationists engage in snorkeling and diving, boating, canoeing and kayaking, fishing, waterskiing, and other activities (Gold 2008, pgs. 4-5). Local eco-tour operators, dive shops, marinas, hotels and motels, restaurants, and other businesses benefit from these activities (Buckingham 1990, p. 6).

Watercraft associated with recreational and commercial activities strike and kill manatees. In the State's northwest region, where Kings Bay is located, adult manatee mortality is almost equally split between human-related and natural causes, with watercraft collisions being the leading source of human-caused mortality. From 1974 through 2010, 16 manatees died from collisions with watercraft in Kings Bay. Eleven of these deaths occurred between 2003 and 2010, including seven that occurred during the summer.

Manatee viewing activities provide a significant source of revenue to the local economy (Buckingham 1990, p. 6). Local eco-tour businesses bring visitors out to Kings Bay where visitors view manatees while in the water, from boats, and from other vantage points. Some manatees initiate encounters with visitors but most manatees avoid or ignore encounters with people, preferring to frequent manatee sanctuaries where all human activities are prohibited. Some manatees are harassed by visitors, despite the fact that all forms of harassment are prohibited by law.

Hartman (1979, pgs. 128-131) was the first to observe and describe how manatees respond to the presence of people in the water, observing that most manatees tended to avoid people, some ignored people, a few approached people with curiosity and then left, and some approached and solicited interactions with people. These observations were made in Kings Bay's warm water springs and the author correlated a reduction in the number of manatees using the Main Spring with an increasing number of people (Hartman 1979, p. 131). Concern has been expressed about manatees displaced from warm water springs for prolonged periods of time; prolonged exposure to cold can be fatal to manatees, especially for smaller animals (O'Shea 1995, p. 304). Hartman believed that both people in the water and boats harassed manatees in Kings Bay (Hartman 1979, p. 126).

Researchers have observed and documented manatee responses to people and boats (Sorice *et al.* 2003, p. 324). Researchers noted increases in swimming, milling, and cavorting behaviors and decreases in resting, feeding, and nursing behaviors in the presence of increasing numbers of people and boats (Abernathy 1995, pgs. 23–26; Wooding 1997, p. 1; King and Heinen 2004, pgs. 230–231). They also observed that increases in numbers of boats and people prompted manatees to use other areas (Kochman *et al.* 1985, pgs. 922–924; Buckingham *et al.* 1999, p. 514). However, none of these studies' observations of manatee responses to viewing participants and boats suggest that harm (killing or injuring of manatees) has occurred or is occurring (Sorice *et al.* 2003, p. 320). Nor have there been any significant increases in the number of cold-related injuries and mortalities in the northwest Florida region. Manatee survival rates in the northwest region are among the highest in Florida (FWC FWRI Manatee Mortality Database 2010 website; Runge *et al.* 2007, p. 20).

Based on increasing numbers of manatees, waterway users, watercraft-related manatee deaths, and reports of manatee harassment, we conclude that human conflicts with manatees are increasing in this area.

#### 1.4 Project Purpose

Consistent with the goals of the Service's Florida Manatee Recovery Plan (2001) and its status review of the West Indian manatee (2007), the purpose of the proposed action is to prevent the take of manatees caused by certain waterborne activities in this area by designating Kings Bay as a manatee refuge, pursuant to 50 CFR Subpart J – Manatee Protection Areas, §17.103. Waterborne activities occurring in Kings Bay that are known to take manatees include the actions of recreationists who harass manatees while viewing, boaters who strike and injure or kill manatees while boating, and other activities. While the number of takings has been offset by the measures currently in place, an increasing

number of waterway users and manatees are increasing the number of takings that occur. By designating Kings Bay as a manatee refuge, we will prevent the number of manatees taken by human activities in this area.

### 1.5 Decision to be Made

The Director will decide whether or not the proposed rule will provide the appropriate means by which to address the take of manatees known to occur in Kings Bay, Florida, and, if appropriate, will support the adoption and implementation of a final rule to prevent the take of manatees in this area.

### 1.6 Compliance with Laws, Regulations, and Plans

This EA has been prepared in compliance with all applicable Federal statutes, regulations and executive orders (EO) including, but not limited to, the following:

- National Environmental Policy Act (NEPA) of 1969, as amended (42 United States Code [U.S.C.] 4321 *et seq.*)
- Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1508)
- U.S. Fish and Wildlife Service Manual, Part 550, Chapter 1 (National Environmental Policy Act - Policy and Responsibilities) and Chapter 2 (National Environmental Policy Act Compliance Guidance)
- Endangered Species Act (ESA) of 1973 (16 U.S.C. 1531-1544, as amended)
- Marine Mammal Protection Act (MMPA) of 1972 (16 U.S.C. 1361-1407, as amended)
- Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 *et seq.*, as amended)
- Clean Air Act of 1972 (42 U.S.C. 7401-7671, as amended)



- Clean Water Act (CWA) of 1977 (33 U.S.C. 1251 *et seq.*)
- Migratory Bird Treaty Act of 1918
- National Historic Preservation Act of 1966, as amended (16 U.S.C. 470)
- Archaeological Resources Protection Act of 1979 (16 U.S.C. 470)
- Protection of Historic and Cultural Properties (36 CFR 800 *et seq.*)
- Federal Noxious Weed Act (7 U.S.C. 2801)
- E.O. 11514, Protection and Enhancement of Environment Quality
- E.O. 11593, Protection and Enhancement of the Cultural Environment
- E.O. 11988, Floodplain Management
- E.O. 11990, Protection of Wetlands
- E.O. 12898, Environmental Justice
- E.O. 13112, Invasive Species Management
- E.O. 13186, Protection of Migratory Birds.

In addition, all action alternatives will comply with the Service's Florida Manatee Recovery Plan (2001) and the Service's status review of the West Indian manatee (2007). All action alternatives will also be consistent with FWC's Florida Manatee Management Plan (2007).

## 1.7 Permitting Requirements and Authorizations Needed

Should the proposed rule be adopted as a final rule, the Service, pursuant to section 7(a)(2) of the ESA, will consult to insure that the action will not jeopardize the continued existence of any listed species nor result in the adverse modification of any critical habitat.

## 1.8 Scoping Summary

The Service's North Florida Ecological Services Office has discussed concerns and possible solutions needed to address manatee harassment and other takings occurring in Kings Bay, Florida with many of its stakeholders over the past several years. Additional scoping activities will include a public workshop and a public hearing, consistent with the dates, locations, and meeting formats identified in the Federal Register Notice.

### 1.8.1 Internal Agency Scoping

Manatee harassment concerns and concerns related to the take of manatees by watercraft collision in Kings Bay have been the focus of numerous discussions over the past several years. These discussions have addressed Federal and State "harassment" regulations, education and outreach materials designed to minimize harassment, enforcement efforts to address harassment, and other relevant topics. These discussions occurred in the context of the Florida Manatee Recovery Team's Manatee Protection Working Group meetings, Crystal River NWR permit holder and public meetings, and at Commission meetings held in Crystal River.

### 1.8.2 Public Scoping

While there has been a significant level of public involvement in agency scoping activities regarding the take of manatees in Kings Bay, the Service will further engage the public in a public workshop and a public hearing, to be held in Crystal River, Florida. The proposed rule and draft environmental assessment will also be provided to the public in a variety of media for review and comment during a 60-day comment period.

### 1.8.3 Issue Identification

An issue, in the context of NEPA, is a cause-and effect relationship that may result from implementation of an action. An issue is a point of disagreement, debate, or dispute with a proposed action, based on some anticipated effect. Significant issues (*i.e.*, issues within the scope of the proposed action, not already decided by law, regulations, or land management plan, and relevant to the decision to be made) related to the proposed project have been addressed in this EA either through the formulation of the alternatives and mitigation measures in Chapter 2 or in the analysis of effects on the particular resource of concern (*e.g.*, recreation) in Chapter 3. Significant issues identified during scoping processes (internal and public) are that the proposed designation of a manatee refuge may:

- eliminate a seasonal watersports area located in Kings Bay
- eliminate access to Three Sisters Springs
- eliminate access to Kings Springs (aka “The Keyhole”)

## 2.0 Alternatives Including the Proposed Action

This chapter describes the process that was used to develop alternatives for preventing the take of manatees in Kings Bay. The detailed analysis of effects is described in “Section 2.1 Alternative Formulation”.

### 2.1 Alternative Formulation

Development of alternatives for preventing the take of manatees in Kings Bay entailed consideration of three key variables: 1) the current network of manatee protection areas in Kings Bay,

pursuant to 50 CFR Subpart J – Manatee Protection Areas and National Wildlife Refuge System Improvement Act of 1997 and State authorities; 2) Federal regulations prohibiting the take of manatees, as described in for 50 CFR 17.3 and 50 CFR 18.3; and 3) law enforcement activities.

#### 2.1.1 Current Network of Manatee Protection Areas

To prevent the take of manatees, the Service and the State of Florida have designated a network of manatee protection areas at sites throughout Florida where threats to manatees have been well documented and where manatees are known to frequently occur. This network supports our goal of providing areas of protected habitat throughout peninsular Florida, adequate to satisfy the biological needs of the species.

Kings Bay currently includes seven Federal manatee sanctuaries and five State manatee speed restricted areas. Manatee observation and boating activities take (harass and kill) manatees in this area, despite this network of protection measures. Previous efforts to address increasing numbers of takings from these activities have included adding protected areas, expanding existing manatee protection area boundaries, making protection area measures more restrictive, and other management practices. While these efforts have been effective, changing recreationist activities and manatee use patterns contribute to increases in the number of takings and, thereby, create a need to implement additional measures.

Under the proposed manatee refuge designation, refuge restrictions would improve the Service's ability to address takings associated with watercraft and with manatee viewing activities. Restrictions would require all watercraft to operate at slow speed throughout Kings Bay except in those areas where more restrictive measures are in place (idle speed zones, no entry areas, and sanctuaries) as posted, to prevent the number of watercraft-related deaths and injuries occurring in Kings Bay. Harassment associated with manatee viewing activities will be controlled through the establishment of no entry areas

not to exceed specified distances around existing manatee sanctuaries, the designation of no entry areas at lesser springs when needed, and the identification of manatee refuge-specific prohibitions.

### 2.1.2 Federal Regulations Prohibiting the Take or Harassment of Manatees

It has been suggested that current Service regulations prohibiting the take, and more specifically, harassment, of manatees could be modified to improve public understanding and enforceability of the law. The Service defines takings, including harassment, in its implementing regulations for both the ESA and the MMPA (50 CFR 17.3 and 50 CFR 18.3). These regulations prohibit the take of listed species, including manatees. Federal and State law enforcement officers enforce the ESA and MMPA, current regulations, citing and prosecuting violators who engage in activities known to take manatees, including violators who harass manatees while engaged in viewing activities.

Pursuant to the Service's implementing regulations under the ESA, harassment includes any intentional or negligent acts or omissions that create the likelihood of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns. Normal behaviors include but are not limited to, breeding, feeding, or sheltering. Under the Service's implementing regulations pursuant to the MMPA, harassment means any act of pursuit, torment, or annoyance which, (i) has the potential to injure a marine mammal or marine mammal stock in the wild; or (ii) has the potential to disturb a marine mammal or marine mammal stock in the wild by causing disruption of behavioral patterns, including, but not limited to, migration, breathing, nursing, breeding, feeding, or sheltering.

The regulations could be modified to incorporate "no touch" and "approach distance" restrictions. Under a "no touch" restriction, touching manatees would be considered a form of harassment and would be prohibited by law. Similarly, an "approach distance" restriction would prohibit anyone from

approaching a manatee within a fixed distance. Anyone approaching a manatee from some specified distance would be cited for harassment.

The modified restrictions would be difficult to enforce in light of the fact that manatees knowingly approach and, on occasion, initiate physical contact with people. Distinguishing between a manatee-initiated approach and contact and a person-initiated approach and contact could be difficult, especially when there are large numbers of manatees and people present. A fixed “approach distance” would be additionally difficult to enforce, given inherent difficulties associated with gauging distances in and on the water.

### 2.1.3 Changes to Law Enforcement Activities

Additional management practices used to minimize the take of manatees in Kings Bay include enforcement of protection area measures, education and outreach efforts, and monitoring manatee and recreationist activities.

#### Enforcement effort

Current enforcement activities include the use of Service special agents, Service Refuge law enforcement officers, USCG law enforcement officers, FWC law enforcement officers, and others. A fixed number of Service Refuge law enforcement officers are present on-site at Crystal River NWR and FWC maintains a local enforcement presence at its district headquarters, located in northern Citrus County. USCG officers are also locally present, deploying from USCG Station Yankeetown. Additional officers are brought into the Kings Bay area from outside the area to support local enforcement activities.

Enforcement efforts can include local, on-the-water officers, who police Kings Bay waters singly or in greater numbers from boats and other platforms. When needed, the number of patrolling officers is supplemented with officers from other locations. Occasionally, manatee enforcement details occur, when many officers police Kings Bay for some specified period of time. Uniformed and undercover officers enforce measures from boats and through a variety of other techniques. Patrol efforts are enhanced through the use of remotely deployed monitoring cameras.

Measures currently in place to minimize the number of manatees taken by recreationists and other waterway users could be maintained and supplemented with more Service enforcement officers at Crystal River NWR and additional resources. While additional officers and equipment would improve and enhance existing efforts, these additions would not address the need for changes to the protection areas, changes to existing permitting programs, improved education and outreach efforts, and monitoring activities.

## 2.2 Alternatives Analyzed in Detail

Pursuant to “2.1 Alternatives Formulation”, modifications to individual management actions may improve efforts to reduce the take of manatees in Kings Bay. However, improvements to any one management action would not address all of the elements that are needed to minimize the take of manatees in this area.

### 2.2.1 Alternative A No Action

Maintain existing management measures. Existing measures in Kings Bay include:

- a network of Service and FWC manatee protection areas in Kings Bay
- 50 CFR 17.3 and 18.3 takings and harassment regulations
- Federal and State law enforcement efforts

#### 2.2.2 Alternative B Designate a Kings Bay Manatee Refuge (Proposed Action)

The proposed manatee refuge designation would modify the existing network of Service and FWC manatee protection areas in Kings Bay and improve our ability to enforce takings and harassment regulations. Proposed designation measures include:

- a year-round refuge within Kings Bay
- the ability to designate temporary no-entry areas between April 1 and November 14 for no more than 14 days just before or after the winter season in Kings Bay
- the ability to designate temporary no-entry areas in Kings Bay between November 15 and March 31 to specified distances outside the existing sanctuaries and at House Spring, Jurassic Spring, and Idiot's Delight Number 2 Spring
- a Kings Bay requirement for manatee-safe lines and other measures to prevent takings due to entanglement



- restricting boat speeds in Kings Bay to slow speed throughout the year except in those areas where more restrictive measures are in place
- manatee refuge-specific prohibitions that enhance our ability to enforce takings and harassment prohibitions

### 2.2.3 Alternative C Modify Sanctuaries

Modify existing sanctuary designations and maintain all other management measures currently in place. Modifications would include:

- expanding existing sanctuary (no entry area) boundaries for sanctuaries that have become too small to admit growing numbers of manatees
- eliminating sanctuaries no longer used by manatees
- adding sanctuaries in areas newly used by manatees
- removing high speed areas where manatees are struck and killed by boats
- extending/reducing period of time that sanctuaries remain in effect

#### 2.2.4 Alternative D Promulgate Harassment Regulations

Promulgate “no touch” and “stand-off distance” regulations to better control manatee harassment violations and maintain all other management measures currently in place.

#### 2.2.5 Alternative E Increase/Enhance Law Enforcement

Increase/enhance existing enforcement efforts and maintain all other management measures currently in place. Increased enforcement efforts include increasing the number of Federal law enforcement officers in Kings Bay, increasing the number of law enforcement details that occur in Kings Bay, increasing the amount of overtime hours available for added enforcement, etc. Enhancement activities could include expanded remote monitoring capabilities, improved and additional equipment, etc.

### 2.3 Mitigation Measures

Mitigation measures are measures prescribed to avoid, reduce, or compensate for the adverse effects of an action on natural, cultural, and socioeconomic resources. If Alternative B, the proposed action “Designate a Kings Bay Manatee Refuge” is selected, the Service believes that there will be negligible effects to these resources. More specifically, adoption of this alternative should not result in changes to non-manatee wildlife, on-site vegetation, water and air quality, noise levels, and cultural and socioeconomic resources.

## 2.5 Comparison of Alternatives

The relative effects of each of the alternatives, including the No Action alternative, on existing management measures are summarized in Table 2.5. The table provides an overview of the analysis and a comparison of the alternatives.

Table 2.5 Comparison of Alternatives

<b>Existing Measures</b>	<b>Alternative A</b>	<b>Alternative B</b>	<b>Alternative C</b>	<b>Alternative D</b>	<b>Alternative E</b>
Network of manatee protection areas in Kings Bay	No change	Change	Change	No change	No change
Harassment regulations	No change	No change	No change	Change	No change
Federal and State law enforcement efforts	No change	No change	No change	No change	Change

Alternative A: No Action

Alternative B: Proposed Kings Bay Manatee Refuge

Alternative C: Modify existing network of manatee protection areas

Alternative D: Promulgate harassment regulations

Alternative E: Increase/enhance law enforcement

### 3.0 Affected Environment

#### 3.1 Location

Kings Bay, site of the proposed Kings Bay Manatee Refuge, is a 600-acre embayment at the headwaters of the tidally influenced Crystal River. The headwaters include a first magnitude spring system with an average total discharge rate of 975 cubic feet per second (SWFWMD 2004). Surrounding shorelines are populated by wetland areas, waterfront homes, and numerous subdivisions. Recreational and commercial activities associated with the bay's distinctive habitat and wildlife provide significant support for the local economy.

#### 3.2 Natural Resources

Kings Bay's waters are home to a diverse assemblage of local aquatic and water-dependent species, including: 21 species of amphibians, 191 species of birds, 22 species of mammals, and 47 species of reptiles. Protected species known from the area include the Florida manatee, the Gulf sturgeon, and the wood stork, as well as listed sea turtles. There are no known protected plant species in Kings Bay. Predominant plant species found here include: *Myriophyllum spicatum*, *Lyngbya* sp., *Vallisneria americana*, *Potamogeton pectinatus*, *Najas guadalupensis*, *Hydrilla verticillata*, *Chara* sp. and *Ceratophyllum demersum* (SWFWMD 2004).

#### 3.3 Water Quality

Kings Bay's water quality is largely compromised by nutrient loading, primarily introduced into the system from the 30 springs that provide water to the bay. Other nutrient sources include sewage

treatment effluents, septic tank leachate, and stormwater runoff. Excess nutrients fuel the growth of algae and inherent declines in water clarity and rooted aquatic plants. Water quality is declining and efforts are being made to reduce the amount of nutrients entering the bay.

### 3.4 Commercial and Recreational Activities

Recreational activities known to occur in Kings Bay include cruising, waterskiing, personal watercraft use, canoeing and kayaking, manatee viewing, snorkeling and diving, and fishing. Commercial activities include eco-tour businesses, boat charters, and commercial fisheries (primarily crabbing).

## 4.0 Environmental Consequences

This chapter describes aspects of the environment that may potentially be affected by each of the alternatives.

### 4.1 Alternative A No Action

#### A. Impacts to Natural Resources

The current condition of Kings Bay's wildlife habitat and its environmental attributes, including vegetative communities and water quality, would not experience any change under the no action alternative.

## B. Manatee Impacts

The number of manatees taken by harassment and boat collision-related injuries and deaths would continue to increase.

## C. Economic Impacts

In the absence of actions to reduce increasing manatee harassment activity and boat collision-related manatee injuries and deaths, litigation and other actions could result in greater restrictions that could, eliminate many local eco tour activities and have significant effects on the local economy.

## D. Recreation and Public Access

This action would not change existing recreation and public access conditions.

# 4.2 Alternative B Designate a Kings Bay Manatee Refuge (Proposed Action)

## A. Impacts to Natural Resources

The current condition of Kings Bay's wildlife habitat and its environmental attributes, including vegetative communities and water quality, would not experience any significant changes under the proposed action.

## B. Manatee Impacts

Adoption of the proposed Kings Bay Manatee Refuge would reduce the number of manatees taken through harassment and injury and death caused by boating activities.

## C. Economic Impacts

In order to gauge the economic impact of this proposed rule, both benefits and costs are considered. Potential economic benefits related to this proposed rule include: increased manatee protection and tourism related to manatee viewing, increased property values, increased boater safety, increased swimmer safety, improved fisheries health, and decreased shoreline maintenance costs. Potential economic costs are related to increased administrative activities related to implementing the rule and restrictions on certain waterborne activities. Economic costs consider the number of recreationists who use alternative sites for their activity or have a reduced quality of the waterborne activity experience in the designated manatee refuge. The effect of slower speeds on commercial fishermen is also considered.

### Economic Benefits

We believe that the proposed establishment of Kings Bay Manatee Refuge will increase the level of manatee protection in these areas. Improved protection for the manatee may result in direct economic benefits by insuring the continued, local presence of viewable manatees and insuring the continued existence of the manatee viewing industry. Indirect benefits include the protection of private and publicly owned shorelines from high-speed wakes, the protection of aquatic vegetation from losses due to excessive turbidity caused by high-speed boat traffic,



increased property values, and reductions in high-speed boating-related human deaths and injuries.

The public's support for manatees and their protection has been examined through contingent value studies (Bendle and Bell 1995, pp. 8-17; Fishkind and Associates 1993, pp. 5-11). These economic studies characterized the value placed by the public on this resource and determined that the public's willingness to pay for manatee protection is significant and that public support for manatee protection regulations in general, such as that described in the proposed rule, exists.

Bendle and Bell (1995, p. ii) conducted a representative survey of Florida residents in general (through random sample) and attempted to answer the question "How much are Florida residents willing to pay to cover the costs associated with protecting the manatee?" In 1993 dollars, efforts to protect the manatee population were valued at an estimated \$2.6 billion or \$14.78 per household (or \$4.03 billion or \$22.91 per household, when adjusted to reflect 2011 monetary values). Based on surveys of north Florida residents, Fishkind and Associates (1993, p. 11) estimated that adult Florida residents would be willing to pay \$30 per year in 1992 dollars (or \$47.70 per year when adjusted to reflect 2011 monetary values) to help compensate for the adverse economic effects, if any, of protecting the manatee population (Fishkind and Associates 1993, pp. 28-30).

It is difficult to apply the results of these studies to the proposed rule, because neither study measures an impact similar to that associated with this rulemaking, which applies only to the Kings Bay area. For example, the Fishkind and Associates study (1993, p. 1) was designed to gauge the economic impact of the Florida Manatee Sanctuary Act. First, the estimates of

economic benefit were predicated on a different baseline in terms of both the manatee population being protected at that time versus now, and the regulatory conditions, such as manatee protection areas, that were in existence at the time. Second, this study is not clear about the type and extent of manatee protection; it does not clearly state if protection refers solely to the designation of manatee protection areas or if protection is interpreted to include implementation and enforcement of protection measures. The study also does not clearly state whether residents are willing to pay for manatee protection within a specific region or for manatee protection throughout the State of Florida. While neither of these studies is specific enough to apply to this proposed rule, they do provide an indication that the public confers substantial value on the protection of manatees.

Another potential economic benefit is continued and increased tourism that likely results from an increase in manatee protection. Citrus County and Kings Bay are nationally and internationally recognized as a primary destination for winter-time manatee viewing. Surveys of visitors to Citrus County estimate that about half come to enjoy water-based activities, including manatee viewing, snorkeling, and diving (in order of preference) (Gold 2008, pp. 4-8). Hundreds of thousands of individuals are believed to engage in this activity each winter, and the number of participants is thought to be increasing.

Visitors and local residents view manatees in Kings Bay from boats or while in-water, viewing manatees while on their own or through local eco-tour operators. Visitors may pay eco-tour operators to equip them and take them out onto Kings Bay to view manatees; vendors provide both in-water and on-water experiences. In-water rentals include wetsuits, masks, snorkels, and related gear. On-water rentals include canoe, kayak, and other boat-type rentals. Other visitors travel to the area and engage in manatee viewing activities using their own

equipment, including boats and other needed gear. Many visitors to the area stay at local hotels and eat at local restaurants. There are no reports or estimates of direct costs and expenditures associated with the manatee viewing activity.

While there is no information that describes the number of boats associated with manatee viewing activities, including those boats used by residents, boats trailered to the area by visitors, boats used to transport eco-tour clients, and boats leased to individuals watching manatees, a recent evaluation on the impact of boating on Florida, Florida's North Central Region, and Citrus County suggests that the overall economic impact of this activity is important (FWC 2009 Online Boating Economic Impact Model website). As such, that percentage of the boats used for manatee viewing activities is likely of importance to the region and may benefit from this rulemaking.

FWC's evaluation of Citrus County boating activities occurred in 2006 and describes 14,304 county-registered boats (13,283 power boats and 1,021 non-power boats, including 903 kayaks and canoes) and 402,029 boat days in Citrus County waters. Over 60 percent of the boat trips taken by these boats occur in Citrus County; local boat ramp infrastructure emphasizes salt water destinations (calculated 2006 ramp lane capacities provide access for 10,620 launches, including 8,883 saltwater launches and 1,737 freshwater launches). The economic significance of Citrus County's registered boats and their activities is estimated at \$104,740,000 annually in 2006 dollars (or \$116,261,400 when adjusted to reflect 2011 monetary values); \$63,513,400 (or \$70,449,874 in 2011 monetary values) of this amount is spent on boat trips, including \$8,549,200 (or \$9,489,612 in 2011 monetary values) on lodging (14 percent) and \$9,060,500 (or \$10,057,155 in 2011 monetary values) on food. The evaluation does not assess nonresident (or out-of-state) boats. The fraction of county-registered boats used for manatee viewing activities in Kings Bay is

unknown, as is the number of boats trailered to the area by visitors. As such, the contribution of boats used for manatee viewing activities cannot be monetized or evaluated in terms of any economic benefit likely to accrue from this rulemaking.

Businesses that benefit both directly and indirectly from manatee viewing activities can be found in Department of Labor descriptions of Citrus County industries. While these industry descriptions provide useful information about numbers of businesses and the number of individuals employed in them, they do not describe the number of businesses and individuals engaged directly or indirectly in manatee viewing activities. These industries include: leisure and hospitality businesses, professional and business services; and trade, transportation, and utility businesses. Through September 2010, there were 288 leisure and hospitality establishments in Citrus County employing 3,294 individuals; 512 professional and business service establishments employing 3,340 individuals; and 683 trade, transportation, and utility establishments employing 7,330 individuals (U.S. Department of Labor 2011).

Improved protection for the manatee may result in an economic benefit to these industries by insuring the continued local presence of viewable manatees and insuring the continued existence of the manatee viewing industry. However, the viability of the local manatee viewing industry, as practiced by both commercial businesses and individuals, is challenged by reported acts of manatee harassment associated with these activities.

Florida waterfront property owners may benefit from manatee protection areas such as the area described in this proposal. Bell and McLean (1997, p. 1) showed that speed zone enforcement may provide an economic benefit to adjacent landowners. Bell and McLean studied the impact of posted manatee speed zones on the property values of waterfront homes in Fort

Lauderdale, Broward County, Florida. The authors found a strong relationship between property values and slow-speed zones, and found evidence that slow-speed zones may have a positive impact on home sale price. Slow-speed zones were found to correlate with as much as a 15 to 20 percent increase in sale price. The authors speculated that speed zones may increase property values by reducing noise and fast traffic, as well as making it easier for boats to enter and leave primary waterways. In the proposed manatee refuge area, there are shoreline areas where residential property owners may experience these benefits.

In addition, due to reductions in boat wake associated with speed zones, property owners may experience some economic benefits related to decreased costs for maintenance and repair of shoreline stabilization (*i.e.*, seawalls along the water's edge). Similarly, the erosion of shoreline vegetation and aquatic plant communities from boat wakes will lessen, thus improving important fisheries habitat. Speed reductions may also result in increased boater and swimmer safety. These types of benefits cannot be quantified with available information.

Based on previous studies, we believe that this rule would produce some economic benefits. However, given the lack of information available for estimating these benefits, the magnitude of these benefits is unknown.

## Economic Costs

### Affected Recreational Activities

For some waterway users, the loss of a local, high-speed watersports area may reduce the quality of these waterborne activities or may cause them to forgo the activity. The extra time

needed to cross additional slow and/or idle speed areas or to avoid “no-entry” areas may inconvenience some recreationists. In this section, we examine the waterborne activities taking place in the area and the extent to which they may be affected by the designation of the proposed manatee refuge. The resulting potential economic impacts are discussed below. Actual impacts cannot be quantified, however, because an actual number of recreationists using the site is not known.

In the proposed Kings Bay Manatee Refuge, affected waterborne activities include traveling, cruising, waterskiing, personal watercraft use, canoeing and kayaking, manatee viewing, snorkeling and diving, and fishing. Based on a recent visitor study that relied on a variety of survey mechanisms, the two most popular activities in Citrus County were manatee viewing and snorkeling and diving (Gold 2008, pp. 4-8). Recreationists engaging in high-speed activities, including waterskiing, use of personal watercraft, and other similar activities will likely experience some impacts due to the proposed regulations; individuals not engaged in high-speed-related activities are unlikely to experience much impact due to the proposed regulation.

Primary activities that will be affected by the designation of year-round slow and/or idle speeds are those that involve high-speed watercraft operations, including waterskiing, which take place between May 1 and August 31 in the watersports area located in the center of Kings Bay. The proposed regulation may cause some water skiers and other recreationists to forgo high-speed activities here, or may reduce the quality of their experience in the event that these recreationists elect to waterski at less preferred alternative sites.

Without data describing the number of affected recreationists and the number of trips that they make every year to the watersports area, costs associated with the loss of this area are

unknown. If this information were available, we could estimate the impact of lost or diminished skiing days given the value of a waterskiing day published in the literature. One study by Bergstrom and Cordell (1991, p.67) suggested the lost surplus value may be \$46.75 per day (adjusted to reflect 2002 monetary values) for a day of waterskiing. They applied a multi-community, multi-site travel cost model to estimate demand equations for 37 outdoor recreational activities and trip values, including waterskiing. The analysis was based on nationwide data from the Public Area Recreational Visitors Study collected between 1985 and 1987 and several secondary sources.

Thomas and Stratis (2002, pgs. 30-32) evaluated the effect that reductions in the number of available boating destinations had on recreational boaters in Lee County. Reduced boat speeds at certain sites precluded high-speed activities historically associated with these sites, reducing the number of high-speed destinations available to these boaters. Thomas and Stratis in their study demonstrated that some redistribution of boating trips did subsequently occur and concluded that the reduction in boating destinations resulted in an annual estimated loss per boater of \$423.94 in 1996 dollars (or \$597.97 when adjusted to reflect 2011 dollar values). The study was conducted in Lee County, not Citrus County, in 1996, and specific locations and 1996 values localize and date the results.

While studies demonstrate that recreationists can experience a change in the quality of their waterborne experience when speeds are restricted in historical high-speed boater destinations, not enough data are available to estimate any losses in economic value that these recreationists who use Kings Bay are likely to experience. However, given the fact that alternative sites are regionally available, economic impacts are not expected to be significant.

Recreationists who transit the designated, summertime slow-speed area will likely experience a diminished quality of the boating experience due to the additional time needed to transit this area at speeds slower than those historically present. These recreationists likely include anglers traveling to downstream fishing sites, and the additional transit times will affect the time that they have available to fish. Lost fishing time could result in catch losses, thereby diminishing the fishing experience. The number of these recreationists and the number of trips that they make is unknown. As such, the economic cost of this rulemaking on these individuals is unknown.

#### Affected Commercial Charter Boat Activities

Various types of charter boats use Citrus County waterways for nature tours and other activities. The number of charter boats using Kings Bay is unknown, and information on their origins and destinations is lacking. However, many charter boats are used by renters to view manatees, an activity that occurs within the refuge area. The refuge designation is unlikely to cause a significant adverse impact to businesses that provide boats for manatee viewing and may even benefit them. Enhanced manatee protection measures should improve the viewing experience and are likely to positively affect this industry. The extra time required for commercial charter boats used for fishing to reach fishing grounds could reduce onsite fishing time and could result in fewer trips. Added travel time may affect the length of a trip, which could result in fewer trips overall, creating a potential economic impact.



## Affected Commercial Fishing Activities

Local commercial fisheries may experience some impact due to the proposed regulation. To the extent that the proposed regulation establishes additional speed zones in commercial fishing areas, this may increase transit times associated with the fishing activity, affecting the efficiency of commercial fishing. Costs associated with requirements for the use of manatee-safe float lines will likely increase some fishing gear costs.

Crab boats would have to travel at slower speeds in some locations between crab pots, thereby potentially reducing the number of crabs landed on a daily basis. The speed limits may also slow transit speeds between fishing grounds for both crab and mullet fishing boats. The number of fishing boats operating and the amount of blue crab and mullet landings occurring in areas that will be newly designated speed zones under this proposed rule is unknown. Given this, the impact on the commercial fishing industry cannot be quantified.

Crabbers fishing within the Kings Bay Manatee Refuge will need to modify their gear to ensure that manatees do not become entangled in crab pot float lines. The use of stiffened lines, including lines that incorporate stiffeners (wire, lines enclosed in hose or PVC, etc.), crab pot lines to reduce the number of float lines used (where crab pots are strung together and single float lines are used to locate the beginning and end of such a crab pot line), and other methods will increase gear costs. However, the number of crabbers fishing in Kings Bay is unknown, and the extent to which this will impact these users is unknown.

The proposed designation will likely affect commercial fishermen by way of added travel time, which may result in an economic impact. However, because added travel times are unlikely

to exceed an additional 30 minutes beyond existing travel times, it is unlikely that the proposed rule will result in a significant economic impact on the commercial fishing industry.

#### Agency Administrative Costs

Agency administrative costs would include costs associated with signposting, enforcement, and some costs for education and outreach to inform the public about new designations within the manatee refuge. The proposed refuge would require nominal, additional signposting activities; however, the number and location of signs needed to post the proposed manatee refuge is not known. Similarly, additional law enforcement and education and outreach needs are anticipated.

The designation of this manatee refuge will add restrictions to an already-restricted area to better protect manatees. The proposed rule will impact the quality of waterborne activity experiences for some recreationists and may lead some recreationists to forgo certain waterborne activities. While the proposed rule will prohibit certain activities within the refuge area, it does not prohibit recreationists from participating in similar activities elsewhere. Alternative sites are available for all waterborne activities that may be affected by this rule. The inconvenience of having to go slower and/or choose alternative sites for certain waterborne activities will likely have a regional economic cost. While the level of economic benefits that may be attributable to the manatee refuge is unknown (including benefits associated with manatee viewing), these benefits would likely minimize any economic impacts that may be associated with this rule. Given available information, the net economic impact of designating this manatee refuge is not expected to be significant (that is, it will not exceed \$100 million per year).

## D. Recreation and Public Access

The proposed rule would modify recreational activities and current waterway access practices in Kings Bay due to changes in boat speed and access limitations. These limitations will impact the quality of waterborne activity experiences for some recreationists and may lead some recreationists to forgo certain waterborne activities. While the proposed rule will prohibit certain activities within the refuge area, it does not prohibit recreationists from participating in similar activities elsewhere. Alternative sites are available for all waterborne activities that may be affected by this rule.

### 4.3 Alternative C Modify Sanctuaries

#### A. Impacts to Natural Resources

The current condition of Kings Bay's wildlife habitat and its environmental attributes, including vegetative communities and water quality, would not experience any significant changes if actions were taken to modify the existing sanctuaries.

#### B. Manatee Impacts

Modifications to the existing local network of manatee protected areas would provide a temporary respite to increasing numbers of manatee harassment reports, injuries, and deaths in Kings Bay. However, additional rulemakings would continue to be needed to address increasing numbers of takings that would likely accrue in the face of growing numbers of manatees, recreationists, and boats.

### C. Economic Impacts

In the absence of appropriate actions to reduce increasing manatee harassment activity and boat collision-related manatee injuries and deaths, litigation and other actions could result in greater restrictions that could, eliminate many local eco tour activities and have significant effects on the local economy.

### D. Recreation and Public Access

This action would modify recreational activities and current waterway access practices in Kings Bay due to changes in boat speed and access limitations.

## 4.4 Alternative D Promulgate Harassment Regulations

### A. Impacts to Natural Resources

The current condition of Kings Bay's wildlife habitat and its environmental attributes, including vegetative communities and water quality, would not experience any significant changes if the existing harassment regulations were modified.

### B. Manatee Impacts

In light of difficulties associated with enforcing the described harassment regulation modifications, this alternative would not be likely to reduce the numbers of manatees harassed, injured, and killed by recreationists and waterway users in Kings Bay.

### C. Economic Impacts

In the absence of appropriate actions to reduce increasing manatee harassment activity and boat collision-related manatee injuries and deaths, litigation and other actions could result in greater restrictions that could, eliminate many local eco tour activities and have significant effects on the local economy.

### D. Recreation and Public Access

This action would modify recreational practices occurring in Kings Bay.

## 4.5 Alternative E Increase/Enhance Law Enforcement

### A. Impacts to Natural Resources

The current condition of Kings Bay's wildlife habitat and its environmental attributes, including vegetative communities and water quality, would not experience any significant changes if law enforcement activities were increased or enhanced.

### B. Manatee Impacts

Additional officers and equipment would improve and enhance existing enforcement efforts and would likely reduce the numbers of manatees taken by harassment and boat collision-related manatee injuries and deaths. However, these additions would provide a partial means with

which to reduce these takings and would not fully address problems faced by manatees in the area.

#### C. Economic Impacts

In the absence of appropriate actions to reduce increasing manatee harassment activity and boat collision-related manatee injuries and deaths, litigation and other actions could result in greater restrictions that could, eliminate many local eco tour activities and have significant effects on the local economy.

#### D. Recreation and Public Access

This action would not change existing recreation and public access conditions.

### 4.6 Summary of Environmental Consequences by Alternative

Table 4.7 provides a summary of the environmental consequences for each alternative described in this section.

#### A. Past Actions

Suggestions to the effect that manatee populations may be increasing in the face of past actions by Federal, State, and local governments are encouraging. Based on the 5-year review conducted by the Service in 2007 (USFWS 2007), the best available science shows the overall population of the Florida Manatee has increased and the Antillean manatee population in Puerto Rico is stable; neither subspecies

is currently in danger of becoming extinct within all or a significant portion of their range. However, rulemaking procedures to reclassify the manatee from endangered to threatened have not yet begun. Additionally, threats to the species, including human-related mortality, injury, and harassment, and habitat alteration, continue and require on-going and additional actions (such as the preferred alternative) to further the manatee's status to the point at which it no longer requires protection under the ESA. Pursuant to our mission, we continue to assess this information with the goal of meeting our manatee recovery objectives.

## B. Future Actions

Possible future actions associated with the preferred alternative include enhanced law enforcement in the area designated as a refuge and the possible realignment of existing and proposed sanctuaries (permanent and temporary) within the proposed Kings Bay Refuge if the need becomes apparent, for example due to altered weather or manatee use patterns. Such actions are consistent with our goal of recovering the Florida manatee to the extent that it would be removed from the Federal endangered species list.

## C. Cumulative Effects

Observations by law enforcement officers and manatee researchers imply that "take" of manatees and human-related manatee mortalities are reduced in areas designated as refuges or sanctuaries. This indicates that, on a site-specific basis, previous actions to protect the manatee have been successful. However, areas outside of existing refuges and sanctuaries continue to experience human-related manatee injuries and mortalities. The designation of additional refuges and sanctuaries in areas heavily used by manatee and humans alike is expected to prevent take of manatees in these areas and will enhance public

awareness of the measures necessary to protect the manatee. The cumulative impact of designating additional refuges and sanctuaries on the public has also been assessed. Impacts such as loss of recreational areas, increase in travel time, and general inconvenience that many boaters may experience due to these refuges and sanctuaries will generally be limited to small areas within their overall travel area.



Table 4.7 Summary of environmental consequences

<i>IMPACT S</i>	<i>RESOURCE CATEGORY</i>	<i>Alternative A</i>	<i>Alternative B</i>	<i>Alternative C</i>	<i>Alternative D</i>	<i>Alternative E</i>
<i>Wildlife and habitat</i>	<i>Wildlife, including listed species</i>	<ul style="list-style-type: none"> <li>• this alternative will not change existing wildlife habitat beyond existing conditions</li> <li>• this alternative will not change existing wildlife beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed animal species or critical habitat beyond existing conditions</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing wildlife habitat beyond existing conditions</li> <li>• this alternative will not change existing wildlife beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed animal species or critical habitat beyond existing conditions</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing wildlife habitat beyond existing conditions</li> <li>• this alternative will not change existing wildlife beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed animal species or critical habitat beyond existing conditions</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing wildlife habitat beyond existing conditions</li> <li>• this alternative will not change existing wildlife beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed animal species or critical habitat beyond existing conditions</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing wildlife habitat beyond existing conditions</li> <li>• this alternative will not change existing wildlife beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed animal species or critical habitat beyond existing conditions</li> </ul>
	<i>Vegetation, including listed species</i>	<ul style="list-style-type: none"> <li>• this alternative will not change existing habitat beyond existing conditions</li> <li>• this alternative will not change existing vegetation beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed plant species or critical habitat beyond existing conditions</li> <li>• this alternative will not affect distribution, abundance, or trends in populations of exotic plant species</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing habitat beyond existing conditions</li> <li>• this alternative will not change existing vegetation beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed plant species or critical habitat beyond existing conditions</li> <li>• this alternative will not affect distribution, abundance, or trends in populations of exotic plant species</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing habitat beyond existing conditions</li> <li>• this alternative will not change existing vegetation beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed plant species or critical habitat beyond existing conditions</li> <li>• this alternative will not affect distribution, abundance, or trends in populations of exotic plant species</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing habitat beyond existing conditions</li> <li>• this alternative will not change existing vegetation beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed plant species or critical habitat beyond existing conditions</li> <li>• this alternative will not affect distribution, abundance, or trends in populations of exotic plant species</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing habitat beyond existing conditions</li> <li>• this alternative will not change existing vegetation beyond existing conditions</li> <li>• this alternative will not affect Federal candidate, proposed, or listed plant species or critical habitat beyond existing conditions</li> <li>• this alternative will not affect distribution, abundance, or trends in populations of exotic plant species</li> </ul>
	<i>Water quality</i>	<ul style="list-style-type: none"> <li>• this alternative will not change current water uses</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change current water uses</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change current water uses</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change current water uses</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change current water uses</li> </ul>
<i>Manatees</i>	<i>The "take" of manatees</i>	<ul style="list-style-type: none"> <li>• seven Federal manatee sanctuaries, five State protection zones, and existing management measures in Kings Bay would remain unchanged</li> <li>• would perpetuate increasing number of manatees taken in the area</li> </ul>	<ul style="list-style-type: none"> <li>• remove existing protection areas, replace with manatee refuge</li> <li>• reduce the number of manatees taken</li> </ul>	<ul style="list-style-type: none"> <li>• modify existing sanctuaries (add/remove sanctuaries, move boundaries, make measures more/less restrictive, etc.)</li> <li>• would temporarily reduce the number of manatees taken in the area</li> </ul>	<ul style="list-style-type: none"> <li>• modify existing taking and harassment regulations as they apply to manatees</li> <li>• would be difficult to enforce, unlikely to affect the number of manatee takings that occur</li> </ul>	<ul style="list-style-type: none"> <li>• increase/enhance existing law enforcement efforts in Kings Bay</li> <li>• would reduce the number of manatees taken each year but would not improve all of the measures that are needed to substantially reduce the number of manatees taken each year</li> </ul>
<i>Economic</i>	<i>Socioeconomic conditions</i>	<ul style="list-style-type: none"> <li>• this alternative will not change existing socioeconomic conditions</li> </ul>	<ul style="list-style-type: none"> <li>• no effect on community services or community cohesion</li> <li>• no measurable detrimental effects are anticipated in regards to communities or individuals</li> <li>• no disproportionate adverse effects on low-income or minority populations</li> </ul>	<ul style="list-style-type: none"> <li>• no effect on community services or community cohesion</li> <li>• no measurable detrimental effects are anticipated in regards to communities or individuals</li> <li>• no disproportionate adverse effects on low-income or minority populations</li> </ul>	<ul style="list-style-type: none"> <li>• no effect on community services or community cohesion</li> <li>• no measurable detrimental effects are anticipated in regards to communities or individuals</li> <li>• no disproportionate adverse effects on low-income or minority populations</li> </ul>	<ul style="list-style-type: none"> <li>• no effect on community services or community cohesion</li> <li>• no measurable detrimental effects are anticipated in regards to communities or individuals</li> <li>• no disproportionate adverse effects on low-income or minority populations</li> </ul>
<i>Recreation and access</i>	<i>Recreation and public access</i>	<ul style="list-style-type: none"> <li>• this alternative will not change existing recreation and public access conditions</li> </ul>	<ul style="list-style-type: none"> <li>• would modify kinds of recreational activities occurring in Kings Bay due to changes in boat speed and access limitations</li> <li>• would modify current waterway access practices</li> </ul>	<ul style="list-style-type: none"> <li>• would modify kinds of recreational activities occurring in Kings Bay due to changes in boat speed and access limitations</li> <li>• would modify current waterway access practices</li> </ul>	<ul style="list-style-type: none"> <li>• would likely modify recreational practices occurring in Kings Bay</li> </ul>	<ul style="list-style-type: none"> <li>• this alternative will not change existing recreation and public access conditions</li> </ul>

Alternative A: No Action

Alternative B: Proposed Kings Bay Manatee Refuge

Alternative C: Modify existing network of manatee protection areas

Alternative D: Promulgate harassment regulations

Alternative E: Increase/enhance law enforcement

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## 6.0 List of Preparers

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